Exploring Students' Satisfaction In Online Learning Using Regression Analysis

Nor Sabrina Zahari[1*], Noorihan Abdul Rahman[2], Mohd Fahmi Zahari[3]
[1]Faculty of Business and Management, Universiti Teknologi MARA Machang Campus,
Bukit Ilmu, 18500 Machang Kelantan, Malaysia.
[1]sabrina207@uitm.edu.my
[2]College of Computing, Informatics and Mathematics,
Universiti Teknologi MARA,Machang Campus,
Bukit Ilmu, 18500 Machang Kelantan, Malaysia
[2]noorihan@uitm.edu.my
[3]Department of Computer and Mathematical Science,
Universiti Teknologi MARA Permatang Pauh Campus,
13500 Permatang Pauh, Pulau Pinang, Malaysia.
[3]mohdfahmi138@uitm.edu.my
**Corresponding Author*

DOI: https://www.doi.org/10.24191/ijelhe.v20n2.2024

Received: 18 November 2024
Accepted: 13 March 2025
Date Published Online: 30 June 2025
Published: 30 June 2025

Abstract: *Since the COVID-19 outbreak, the majority of universities have implemented an online learning system to ensure that students, particularly those pursuing diplomas, can continue their education. Transitioning from traditional in-person training to online instruction is a challenging process. Additionally, using e-learning tools exposes students to specific challenges. Due to these transitions, participation is mandatory, and students must adapt to the workload and rapid changes. The purpose of this study is to investigate the factors that affect students' satisfaction with online learning, including the course assessment, lecturer performance, and lecturer-student interaction. To determine the connection between satisfaction with online learning and the other three criteria, approximately 100 diploma students from diverse programs at UiTM Machang, Kelantan, participated in a quantitative survey. The findings demonstrated that lecturer-student interaction and course assessment could raise students' satisfaction with online learning.*

Keywords: *students' satisfaction, e-learning, online learning, interaction, lecturer performance, course assessment.*

1. INTRODUCTION

Globally, the COVID-19 pandemic, which began in 2020, has rapidly transformed conventional classroom settings into a flexible online learning environment. In the education sector, as universities and educational institutions increasingly adopt digital platforms to deliver courses and engage students, understanding students' satisfaction with online learning has become critical. Previous studies have defined satisfaction in online learning as students' perceptions of their learning experiences, including the usability of online platforms, the quality of content delivery, interaction with instructors and peers, and the overall effectiveness of the learning process (Daultani et al., 2021; Gantasala et al., 2022).

Students' satisfaction in education is deeply intertwined with the principles and targets of Sustainable Development Goal (SDG 4): Quality Education (Holmes et al., 2022). It is directly related to students' satisfaction in education, whereby lifelong learning is promoted for all learners by providing them with the necessary education. To elaborate, this goal also focuses on ensuring inclusive, equitable, and quality education for all, as well as promoting lifelong learning opportunities. Therefore, it is highly relevant to students' experiences in educational settings, particularly in the context of online learning and digital education, which have become increasingly prevalent in recent years.

According to the Ministry of Higher Education Malaysia (MOHE), around 90% of Malaysian universities switched to online education by March 2020, and until now, online learning is still in practice (Othman et al., 2022). For many students, the transition from traditional in-person classes to online modes of education has posed unique challenges, including adapting to new technologies, managing increased workloads, and maintaining motivation in a virtual environment. These challenges, combined with the potential benefits of flexibility and convenience, have led to varying levels of student satisfaction. Understanding these factors is crucial for educators and institutions to optimise the online learning experience, improve student outcomes, and ensure the long-term success of digital education initiatives. This study aims to investigate

the factors that influence student satisfaction in online learning, with a focus on the role of e-learning in shaping students' perceptions of their learning experience. By analysing students' feedback and usage patterns, educators can more effectively use online learning tools to address the diverse needs of learners in completing assigned tasks.

2. LITERATURE REVIEW

This paper focuses on two key elements of online learning: interactions and engagement. Student interaction is crucial during the online learning process as it helps create engagement within the learning community, and hence produces an effective learning environment among members (Martin & Borup, 2022; Ong & Quek, 2023). According to Wang and Baker (2015), student engagement refers to the effort a student makes to participate in the learning processes of a particular course. It has also emerged as a crucial factor in the successful conduct of online education. There are three primary forms of student involvement in an online setting: student interaction with other students, student contact with instructors, and student interaction with information. In line with this assertion, Martin & Bolliger (2018) further demonstrated that involvement can enhance satisfaction, emphasising that engagement is essential to both learning and overall student experience.

This paper examines students' satisfaction with online learning at Universiti Teknologi MARA (UiTM) Pahang, with a focus on the challenges of student participation in online activities. The study aimed to identify the types of online learning activities used, the approaches lecturers take to encourage participation, and the level of student satisfaction. The findings revealed that the most commonly used online activities were online tests or quizzes, followed by online notes and assignments. Lecturers used clear instructions and simple language during group discussions to promote participation. Overall, students were moderately satisfied with the online learning practices at UiTM Pahang. The study suggests that to improve the effectiveness of online learning, lecturers should consider these findings and make adjustments to enhance the online learning experience (Zamakhsari et al., 2015).

The study by Ngoa, J., Budiyono, & Ngadiman, A. (2021) examines student satisfaction with remote online learning during the COVID-19 pandemic in Indonesia, focusing on 65 undergraduate students of Informatics from a private university in Surabaya. Using Strachota's Student Satisfaction survey and quantitative analysis, the study finds a strong link between student satisfaction and interaction, with content interaction being the most significant predictor.

The study by Baber (2020) examines the effects of the COVID-19 pandemic on online education, focusing on perceived learning outcomes and student satisfaction. Data collected from undergraduate students in South Korea and India revealed that factors such as classroom interaction, student motivation, course structure, instructor expertise, and teaching effectiveness all positively influenced perceived learning outcomes and student satisfaction. No significant differences were observed between the two countries. The findings aim to support educators in enhancing student learning outcomes and satisfaction in online courses during the pandemic.

A study by Kee, D. M. H. T. et al (2021) aimed to assess student satisfaction with e-learning and their learning experiences during the COVID-19 pandemic. A quantitative approach was employed, utilising an online questionnaire survey that involved 150 students from institutions in India and Malaysia. The findings revealed that most students were satisfied with e-learning, as it effectively facilitated their studies. The study also found that convenience and flexibility were significantly linked to positive learning experiences.

According to Bismala, L., & Manurung, Y. H. (2024), the study aimed to assess student satisfaction with e-learning as a method of distance learning during the COVID-19 pandemic, using Importance Performance Analysis (IPA). The findings revealed several areas for improvement, including the quality of materials presented on e-learning platforms, interaction with lecturers, the availability of necessary facilities, and lecturer engagement.

Research by Thoo, A. C. (2021) showed that both the delivery method by lecturer and content of e-learning positively and significantly influenced students' satisfaction at Universiti Teknologi Malaysia (UTM), emphasising its role in fostering digital and data literacy in the context of Industry 4.0.

However, system operations did not significantly impact satisfaction. The study aims to provide insights for developing effective teaching models for general education schools.

Additionally, a study by Wahidin, I.S. (2024) examined the impact of ease of use and students' behavioural engagement on their satisfaction with Padlet as an e-learning tool at UiTM. A total of 170 students from three elective courses participated, with data collected via a questionnaire. The results revealed that both the ease of use of Padlet and students' engagement positively influenced their satisfaction with classroom activities. The study highlights Padlet's role in enhancing collaborative learning by fostering active participation, connectivity, and personalised learning, ultimately improving student satisfaction in higher education through the use of e-learning tools.

3. METHODOLOGY

This study employed a quantitative research approach. The study population consisted of 100 diploma students from various programs at the UiTM Kelantan Branch, Machang Campus. A stratified random sampling method was used to collect samples from the study population. The study sample included 100 diploma students. These students were chosen because they began their studies using blended learning, a combination of face-to-face and online classes. Most of these students experienced online learning as a result of the shift caused by the COVID-19 pandemic, which began in 2020. The research instrument was a questionnaire distributed to each participant via Google Forms. Statistical analyses, including descriptive statistics, Cronbach's Alpha, and multiple regression analysis, were used to analyse the data quantitatively.

4. RESULTS AND DISCUSSION

4.1 RESPONDENT DEMOGRAPHICS

Table 1 below presents the demographic profiles of the respondents (n = 100) in Section A. The first six questions of the survey asked about students' gender, age, program code, medium for online learning, e-learning tools and time spent on online learning among diploma program students at UiTM Kelantan.

Item	Number of Items	Cronbach's Alpha
1. Gender	Male Female	26% 74%
2. Age	18-20 years old 21-23 years old 24-27 years old 28 above	73% 15% 11% 1%
3. Program Code	BA111 BA119 CS111 AM110 BA132	21% 23% 25% 21% 10%
4. Medium of online learning	Google meet Team teaching Zoom Cisco Webex Others	68% 22% 3% 5% 2%
5. The most popular e-learning tool among students in an online class	Smartphones Computer Tablets Laptop	45% 3% 5% 47%
6. How much time is spent (student learning time) for online learning?	Less than one hour per day 2-3 hours per day 4-5 hours per day More than 6 hours per day	66% 31% 2% 1%

Table 1: Demographic Profile

It can be concluded from Table 1 that most of the respondents are female (74%). In addition, most participants are aged between 18 and 20 years (73%), and the most represented program code involved in this online learning survey is CS111 (25%). Google Meet is the primary platform used for online learning, accounting for 68%. Based on the analysis, the most popular e-learning tool among students is the laptop (47%), although many students still use smartphones as their primary device for online learning. It was also found that most respondents (66%) spent less than one hour per day on online learning activities. These results indicate a relatively low percentage of students allocating sufficient time to online learning.

4.2 RELIABILITY TEST

The consistency of the interval items in the questionnaire for this study was tested using Cronbach's Alpha analysis. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items is as a group. According to Hair et al. (2007), each item is reliable if Cronbach's Alpha coefficient value is greater than 0.60.

	Items	**Cronbach's Alpha**
Cronbach Alpha	24 questions	0.971

Table 2: Cronbach's Alpha

Table 2 shows that the Cronbach's Alpha coefficient obtained for the 24 items was 0.971. The interpretation of this value is classified as excellent. Therefore, these items are reliable for further analysis.

4.3 MULTIPLE LINEAR REGRESSION ANALYSIS

Multiple linear regression is an effective statistical technique for determining the relationship between each independent variable and a linear dependent variable. This analysis is used to test all of the hypotheses. Additionally, it allows the researcher to identify which independent variable has the most significant impact on the dependent variable.

Based on Model 1.1 below, there are three independent variables: the interaction between the lecturer and students, lecturer performance, and course assessment. Student satisfaction is the dependent variable in this study.

y = b0 + b1X1 + b2X2 + b3X3 + ..bXbY……...(model 1.1)

Student satisfaction = 0.507 + 0.374*X*1 (interaction between lecturer and students) +-0.143*X*2 (lecturer performance) + 0.636*X*3 (course assessment)

Based on Table 3, the R-squared value of the study is $R^2 = 0.55$, indicating that all independent variables (interaction between lecturer and students, lecturer performance, and course assessment) collectively contribute 55.3%

of the variation in students' satisfaction with e-learning on an online class platform. The other 44.7% of the variation cannot be explained by this model, indicating that there are additional factors that can be used to describe students' satisfaction.

Regression Statistics	
Multiple R	0.744043081
R Square	0.553600107
Adjusted R Square	0.53965011
Standard Error	0.563098385
Observations	100

Table 3: R Square

The results in Table 4 indicate that the model used is acceptable, as evidenced by an F value of 39.6846. The model is also significant, with a p-value of 0.0000, which is significant at the 10% level.

ANOVA

	F	*Significance F*
Regression	39.6846	9.08511E-17*

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.507658919	0.201969	2.513551	0.013617
Interaction	0.374254837	0.120611	3.102997	0.002517 *
Lecturer Performance	-0.143624216	0.128875	-1.11445	0.26787
Course Assessment.	0.636029734	0.102666	6.195164	1.45E-08 *

**significant at 0.05 significance level*

Table 4: ANOVA and t-test

Based on the coefficient table in Table 4, only two independent variables – interaction between lecturers and students (0.0025; p-value less than 10% significant level) and course assessment (0.000; p-value less than 10% significant level) – were significant. As a result, student satisfaction with online learning was positively influenced by the two variables. The most crucial variable in this study is course assessment, as its coefficient value is the highest (0.63). Meanwhile, lecturer performance had no significant effect on student satisfaction.

4.4 DISCUSSION

Course assessment is the most significant variable in this study. This finding is consistent with a previous study by Baber, H. (2020), which found that course structure has a positive influence on perceived learning outcomes and student satisfaction. A mix of assessment types, including quizzes, assignments, discussions, and projects, helps keep students engaged and allows them to demonstrate their understanding in various ways. Receiving prompt feedback on assignments, quizzes, and exams is vital for student satisfaction. It helps students understand their progress, correct mistakes, and stay motivated to improve. Compared to the traditional method, a delay in feedback can lead to dissatisfaction, as students may feel disconnected from the learning process.

Interaction between lecturers and students is also statistically significant in relation to student satisfaction in online classes. The result is consistent with previous studies by Zamakhsari et al (2015) and Blasco-Arcas et al. (2013). In online classes, students may be more passive due to the lack of face-to-face interaction. Lecturers who encourage active participation in discussion forums, group projects, or live sessions, such as webinars or collaborative teaching, foster a more interactive and engaging environment. This makes students feel more connected to the course and to their peers, which positively influences satisfaction. Additionally, in a virtual setting, this kind of emotional intelligence can help create a more welcoming and supportive learning environment, which in turn boosts student satisfaction.

In conclusion, course assessment and interaction between lecturers and students are the main factors influencing student satisfaction in online classes. Clear, fair assessments; an engaging, knowledgeable lecturer; and meaningful interaction can create an environment where students feel valued, supported, and motivated.

5. CONCLUSIONS AND RECOMMENDATION

This research has found that students are satisfied with using e-learning tools in online classes due to the interaction between students and lecturers, as well as the support for continuous course assessments. Course assessment is the most influential factor, as most course assessments have undergone significant changes since the COVID-19 pandemic, particularly with final exams being replaced by final assessments. Policies should encourage the development of more varied and formative assessments in online learning. Traditional exams may not fully capture students' abilities in an e-learning environment; therefore, alternative assessments, such as project-based learning, peer reviews, and continuous assessments, should be considered.

Therefore, lecturers should address students' current levels to increase participation in online learning activities at UiTM Kelantan by using a variety of e-learning tools. As far as the researchers are concerned, this research was conducted to identify how much students spend on online learning, and the result shows that it is about 66% less than one hour per week. Most students use laptops as their e-learning tool to participate in online classes.

Further research could focus on the effectiveness of different teaching methods in online environments, such as flipped classrooms and gamification. This research aims to identify the pedagogical strategies that have the most positive impact on student satisfaction. Research should focus on how emerging technologies, such as artificial intelligence (AI), can be integrated into e-learning platforms to enhance student engagement and satisfaction. Evaluating the impact of these technologies on learning outcomes would be crucial.

From the perspective of policy implications and stakeholders, governments and educational institutions should invest in improving the technological infrastructure for online learning, ensuring that students have access to high-quality devices, reliable internet connectivity, and user-friendly learning platforms. All of this will help increase student satisfaction with learning in the modern era.

6. ACKNOWLEDGEMENTS

The author extends sincere appreciation to the students enrolled in the Diploma programs of BA111 (Business Study), BA119 (Banking Studies), CS111 (Statistics), AM110 (Public Administration), and BA132 (Office Management and Technology) for their valuable participation in this study and for willingly sharing their insights and experiences.

7. FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

8. AUTHORS' CONTRIBUTION

This study was conceptualised by Nor Sabrina, who identified the study's focus and selected the methodological approach. Noorihan carried out data collection. Noorihan also focused on related work, and Nor Sabrina conducted the survey and analysis. Another author, Mohd Fahmi, assisted in searching for the literature review and identifying the appropriate methodology for the study.

9. CONFLICT OF INTEREST DECLARATION

I confirm that the article represents the original work of the author(s) and has not been previously published or submitted for publication elsewhere. This manuscript is not under review by any other journal, in whole or in part. I further affirm that the author has made a substantial contribution to the research, including the integrity and interpretation of the data, and fully supports its submission to IJELHE.

10. REFERENCES

Alalwan, N., et. al (2018). Integrated three theories to develop a model of factors affecting students' academic performance in higher education. IEEE.

Alkhalaf, S., & Nguyen, J.K., Nguyen, A., & Drew, S. (2015). Online Learner Satisfaction and Collaborative Learning. International Journal of Information and Communication Technology Education, 9(2), 66-78.

Baber, H. (2020). Determinants of students' perceived learning outcomes and satisfaction in online learning during the COVID-19 pandemic. Journal of Education and e-Learning Research, 7(3), 285-292.

Baber, H. (2021). Modelling the acceptance of e-learning during the pandemic of COVID-19- A study of South Korea. The International Journal of Management.

Basuony, M. A. K., et al. (2021). The factors affecting student satisfaction with online education during the COVID-19 pandemic: An empirical study of an emerging Muslim country. Journal of Islamic Marketing. https://doi.org/10.1108/JIMA-09-2020-0301

Bismala, L., & Manurung, Y. H. (2021). Student satisfaction in e-learning along the COVID-19 pandemic with importance performance analysis. International Journal of Evaluation and Research in Education (IJERE), 10(3), 753–759. https://doi.org/10.11591/ijere.v10i3.21467

Blasco-Arcas, L., Buil, I., Hernandez-Ortega, B., & Sese, F. J. (2013). Using Twitter in the classroom: The integration of social media in a traditional educational context. Computers in Human Behaviour, 29(2), 575-586.

Daultani, Y., Goswami, M., Kumar, A., & Pratap, S. (2021). Perceived outcomes of e-learning: identifying key attributes affecting user satisfaction in higher education institutes. Measuring Business Excellence, 25(2), 216–229.

D. M. H., Fozeli, et.al (2021). Students' Satisfaction with the Use of E-Learning During the Global Pandemic Asia Pacific Journal of Management and Education, 4(3), 87-102. https://doi.org/10.32535/apjme.v4i3.1271

Gantasala, V. P., Gantasala, S. B., Al Tawil, T. N., & Prasad, P. (2022). Quality of learning experience, student satisfaction, and perceived overall experience in the context of COVID-19. Journal of Applied Research in Higher Education, 14(1), 507–520.

Ghaderizefreh, S., & Hoover, M. L. (2018). Student Satisfaction with Online Learning in a Blended Course. International Journal of Digital Society, 9(3), 1393-1398

Hadi, N. H., Zulkiffli, S. N. A., & Mohamed, W. N. (2022). Students' Satisfaction with Online Learning in a Public University in Malaysia during the COVID-19 Pandemic. Journal of Business and Social Development, 10(1), 1-14. Penerbit UMT. https://doi.org/10.1234/jbsd.v10i1.1234

Holmes, J., Moraes, O. R., Rickards, L., Steele, W., Hotker, M., & Richardson, A. (2022). Online learning and teaching for the SDGs–exploring emerging university strategies. International Journal of Sustainability in Higher Education, 23(3), 503–521.

Martin, F., & Borup, J. (2022). Online learner engagement: Conceptual definitions, research themes, and supportive practices. Educational Psychologist, 57(3), 162–177.

Martin, F., & Bolliger, D. U. (2018). Engagement Matters: Student Perceptions on the Importance of Engagement Strategies in the Online Classroom. Journal of Online Learning and Teaching, 14(1), 43-53.

Malik, M. W. (2010). Factors affecting learners' satisfaction towards e-learning: A conceptual framework. OIDA International Journal of Sustainable Development, vol. 2, no. 3, pp. 77-82. Ontario International Development Agency

Ngoa, J., Budiyono, & Ngadiman, A. (2021). Investigating student satisfaction in remote online learning settings during COVID-19 in Indonesia. Journal of International and Comparative Education, 10(2). https://doi.org/10.1016/j.jice.2021.04.001

Nortvig, A. M., Petersen, A. K., & Balle, S. H. (2018). Factors influencing e-learning and blended learning in relation to learning outcome, student satisfaction, and engagement. The Electronic Journal of e-Learning, 16(1), 46-55. ISSN 1479-4403.

Ong, S. G. T., & Quek, G. C. L. (2023). Enhancing Teacher–Student Interactions and Student Online Engagement in an Online Learning Environment Learning Environments Research, 26(3), 681–707.

Othman, I. W., Mokhtar, S., & Esa, M. S. (2022). The Stages of the National Education System's Operation: Issues, Rationale, and Challenges for the Ministry of Education Malaysia (MOE) in the Face of Post-Pandemic COVID-19 Norms. International Journal of Education, Psychology and Counselling, 7(47), 616–638.

Sahin, I. (2007). Predicting student satisfaction in distance education and learning environments. Turkish Online Journal of Distance Education, 8(2), 1302–6488.

Shaid, N. A. N., Kamaruzaman, F. M., & Sulaiman, N. A. (2021). Online learning during the ongoing COVID-19 pandemic: A survey of students' satisfaction. International Journal of Academic Research in Business and Social Sciences, 11(7), 924-937. https://doi.org/10.6007/IJARBSS/v11-i7/10557

Swan, K. (2001). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. Distance Education, 22(2), 306-316.

Tumiran @ Kamal Nasser, S. D., & Ahmad, J. H. (2021). Satisfaction with online learning among MDAB students at UiTM Kelantan: Transition from high school to university. In e-Proceedings of International Conference on Language, Education, Humanities & Social Sciences (i-LEdHS2021). Universiti Teknologi MARA Cawangan Kelantan.

Wang, Y., & Baker, R. S. (2015). Using learning analytics to identify patterns of engagement and learning outcomes in online courses. Journal of Educational Computing Research, 52(3), 367-396.

Wright, G., Volodarsky, S., Hecht, S., & Saxe, L. (2023). Student satisfaction and the future of online learning in higher education: Lessons from a natural experiment. Online Learning Journal, 27(1). Brandeis University.